ARTICLE IV

REQUIREMENTS FOR IMPROVEMENTS, RESERVATIONS, AND DESIGNS

4-101 General Requirements

4-101.1 Conformance to Applicable Rules and Regulations

In addition to the requirements established herein, all subdivision plats shall comply with all applicable laws, ordinances, resolutions, rules, or regulations, including, but not limited to:

1. all applicable provisions of Tennessee Law, regulations, or policy;

2. any zoning ordinance, any building and housing codes, and all other applicable laws or policies of the governing body;

3. the adopted general plan and major road or street (public way) plan;

4. the rules of the County Health Department and the Tennessee Department of Environment and Conservation;

5. the rules, as applicable, of the Federal Highway Administration or Tennessee Department of Transportation, if the subdivision or any lot contained therein abuts a nonlocal highway; and

6. the standards and regulations adopted by all other boards, commissions, and agencies of the governing body, where applicable.

Plat approval may be withheld if a subdivision is not in conformity with the above rules or with provisions set forth in Section 1-104, Policy and Purpose, of these regulations.

4-101.2 Self-Imposed Restrictions

If the owner places restrictions on any of the land contained in the subdivision greater than those required by the zoning ordinance or these regulations, such restrictions or reference thereto shall be recorded with the county register on a separate form, along with the final subdivision plat.

4-101.3 Monuments

Permanent monuments of nondegradable material shall be placed in all subdivisions. Placement of the monuments shall be to the accuracy of a Category I Survey, as defined by the Tennessee Board of Examiners for Land Surveyors in the current Standards of Practice and a statement to that effect shall be signed and sealed by a professional land surveyor licensed to practice land surveying in the state of Tennessee. All monuments will conform to the appropriate type of monuments listed below.

1. **Control Monuments** – A minimum of two (2) control monuments shall be placed in all major subdivisions (as defined by these regulations). At the discretion of the enforcing office, control monuments will generally not be required within minor subdivisions (as defined by these regulations) when the subdivision occurs along existing streets, however, the planning commission retains the right to require control monuments within minor subdivisions where flooding or other extraordinary conditions are found to exist. In areas where minor subdivision plats are accepted to correct errors and omissions, relocate or define areas for subsurface disposal systems, etc., the existing monumentation shown on the plat shall be sufficient.

   All control monuments shall be placed in areas least likely to be disturbed, preferably at the beginning or end of curves along the street rights-of-way, and shall be visible within at least one other control monument within the subdivision. Control monuments shall be placed only after all street construction is complete and curbs have been backfilled or drainage ditches cut.

   The recorded plat shall contain horizontal and vertical data for each control monument. The horizontal data shall be tied to a coordinate system, preferably the Tennessee Coordinate System of 1983, as defined in the Tennessee Code, Section 66-6-101, however, local coordinates will, at the discretion of the Enforcing Officer, be acceptable when it is not practical to use the Tennessee Coordinate System. In either case, each control monument will be tied, by bearings expressed to the nearest second of arc and distances expressed to the nearest hundredth of a foot, to a minimum of two (2) property corners within the subdivision and to the nearest established street right-of-way corner. The vertical datum for the subdivision shall be relative to mean-sea-level and the datum used, (i.e., NGVD29, NAVD88) shall be noted and shown on the recorded plat.

   The following types of monuments, either of which will be acceptable, can be used as a control monument.

   (a) **Concrete Monument** – Shall be no less than four (4) inches in diameter and no less than eighteen (18) inches in length, unless some impregnable material is encountered. The monument must be steel reinforced to facilitate detection by a magnetic locator. The monument shall have a metal cap with the Land Surveyor's name and license number, or company name embedded in the cap and bear a permanent mark for the precise survey point.

   (b) **Iron Bar Monuments** – Shall be no less than five-eighths (5/8) inch in diameter and no less than twenty-four (24) inches in length, unless some impregnable material is encountered. Each bar shall have a permanent metal cap with a minimum diameter of two and one-half (2 1/2) inches with the Land Surveyor's name and license number, or company name embedded in the cap and bear a permanent mark for the precise survey point.

   All monuments shall be set flush with the ground. In the case where impregnable material in encountered, the iron bar monument may be shortened to a minimum of twelve (12) inches.

Concrete is then to be poured in a three (3) inch radium around the bar and to the depth of twelve (12) inches. When depth of soil is less than twelve (12) inches, a new location for the control monument must be established.

2. **Lot Corners** – Metal corners shall mark all external property corners, internal lot corners and right-of-way points. These corners shall be no less than one-half (1/2) inch in diameter and eighteen (18) inches in length. All new corners shall have a cap of noncorrosive material and the cap shall bear the surveyor's registration number or company name.

3. **Witness Corners** – Lot corners that are inaccessible for any reason shall have a witness corner. The witness corner should be set along one of the property lines leaving said lot corner to be monumented and shall be a sufficient distance from the actual lot corner so as there can be no misinterpretation of its location. The witness corner and its tie to the actual lot corner shall be shown and identified on the recorded plat. A witness corner shall be no less than one-half (1/2) inch in diameter, eighteen (18) inches in length and shall have a cap of noncorrosive material and the cap shall bear the surveyor's registration number or company name.

4-101.4 Character of the Land

4-101.401 Land Unsuitable for Development

Land which the planning commission finds to be unsuitable for subdivision or development due to flooding, improper drainage, steep slopes, rock formations, adverse earth formations or topography, utility easements, or other features which would be harmful to the safety, health, and general welfare of inhabitants of the land and surrounding areas shall be designated as "conservation lands" and may be utilized as provided in Subsection 4-101.402, Use of Conservation Lands. Land included within this category shall be as specified below:

- wetlands and land that is generally inundated (land under ponds, lakes, creeks, etc.),
- all of the floodway and floodway fringe area within the 100-year floodplain, as shown on official FEMA maps,
- land with slopes exceeding twenty (20) percent, or soils subject to slumping,
- land situated within sink holes and other karst areas,
- land under permanent easement prohibiting future development (including easements for drainage, access, and utilities).

4-101.402 Use of Conservation Lands

The areas indicated in Subsection 4-101.401, Land Unsuitable for Development, shall generally be designated as undivided open space, to

facilitate easement monitoring and enforcement, and to promote appropriate management by a single entity according to approved land management standards. However, within subdivisions where the gross density is one (1) dwelling unit per five acres (or lower) the required open space may be included within individual lots.

All undivided open space shall be restricted from further subdivision through a permanent conservation easement, in a form acceptable to the city and duly recorded in the office of the County Register of Deeds. Any lot containing required open space that is sufficiently large as to be capable of further subdivison may be restricted so as to prohibit such action.

4-101.403 Protection Against Flood Damage

Where protection against flood damage is necessary in the opinion of the planning commission, flood-damage protection techniques may include, as deemed appropriate by the planning commission:

a. imposition of any surety and deed restrictions enforceable by the planning commission to regulate the future type and design of uses within flood prone areas; and

b. flood protection measures designed so as not to increase, either individually or collectively, flood flow, height, intensity, duration, or damages, and so as not to infringe upon the regulatory floodplain.

c. installation of flood warning systems.

d. the use of fill, dikes, levees, and other protective measures.

e. the use of floodproofing measures, which may include:

   (i) anchorage to resist flotation and lateral movement.

   (ii) installation of watertight doors, bulkheads, shutters, or other similar methods of closure.

   (iii) reinforcement of walls to resist water pressures.

   (iv) use of paints, membranes, or mortars to reduce seepage through walls.

   (v) addition of mass or weight to structures to resist flotation.

   (vi) installation of pumps to lower water levels in structures.

   (vii) construction of water supply and waste treatment systems so as to prevent the entrance of or contamination of flood waters.

(viii) installation of pumps or comparable facilities for subsurface drainage systems to relieve external foundation wall and basement flood pressures.

(ix) building design and construction to resist rupture or collapse caused by water pressure or floating debris.

(x) installation of valves or controls on sanitary and storm drains which permit the drains to be closed to prevent backup of sewage and storm water into buildings or structures.

(xi) location and installation of all electrical equipment, circuits, and appliances so that they are protected from inundation by the regulatory flood.

(xii) location of storage facilities for chemicals, explosives, buoyant material, flammable liquids, or other toxic materials which would be hazardous to public health, safety, and welfare at or above the regulatory flood protection elevation, or design of such facilities to prevent flotation of storage containers or damage to storage containers which could result in the escape of toxic materials.

The acceptability of any flood protection methods formulated by the subdivider or his agent shall be determined by the planning commission, which shall be guided by the policies set forth in Section 1-104 and Subsection 2-101.4, of these regulations.

4-101.5 Subdivision Name

The proposed name of the subdivision shall not duplicate or too closely approximate phonetically the name of any other subdivision within Sumner County. The planning commission shall have authority to designate the name of the subdivision, which shall be determined at conceptual plan approval.

4-101.6 Authorization to Construct Improvements

Construction may proceed upon issuance in accordance with Subsection 2-103.9, of a "Certificate of Preliminary Approval". Such certificate shall be issued only when a grading permit has been obtained and surety is in place to assure land reclamation in event the development is not completed.

4-101.7 Maintenance of Improvements

4-101.701 Streets Designated as Construction Routes

Streets designated as construction routes within a subdivision shall be maintained for a time period specified in the Dedication Agreement submitted in accordance with Section 5-105, Form of Dedication Offer.

4-101.702 Other Streets

Streets other than those designated as construction routes shall be maintained as provided herein.

Generally, the final paving course shall not be applied until seventy-five (75) percent of the houses fronting along a street are completed. However, when an undue hardship is created by disallowing the final paving of a street prior to construction of seventy-five (75) percent, but not less than fifty (50) percent, of the houses fronting along a street, the Enforcing Officer may permit final paving to occur and the city may allow the subsequent release of the performance bond provided a maintenance bond is substituted therefor. The city may permit the maintenance/warranty bond to be renewed if additional time is needed to complete further buildout of the subdivision.

The maintenance/warranty bond may be released after a period of one (1) year or when at least seventy-five (75) percent of the houses fronting along a street have been satisfactorily completed, inspected and released by the inspecting departments. The maintenance/warranty bond shall be in an amount and for a term as recommended by the Enforcing Officer and shall be posted in conformance with the procedures presented in Article III, of these regulations. Under no circumstances shall final paving occur until all utility installations, including service lines to individual lots are complete.

4-102 Lot Requirements

4-102.1 Lot Arrangement

4-102.101 General

Each lot shall contain a sufficient “building envelope” (See Definition) such that there will be no foreseeable difficulties, for reasons of topography, slope/foundation stability, flood hazards, or other conditions in locating the structures and driveway access to the structures upon such lot. All lots shall have dimensions and area sufficient to ensure that the building setbacks and yards are in compliance with any zoning ordinance. No “building envelope” may include any land defined as “unsuitable for development” by the provisions of Subsection 4-101.401 (above).

4-102.102 Evaluation Criteria

In evaluating the layout of lots and open space the following criteria will be considered by the planning commission as indicating design appropriate to the site’s natural, historic, and cultural features, and meeting the purposes of these regulations. Diversity and originality in lot layout shall be encouraged to achieve the best possible relationship between development and conservation areas. Accordingly, the planning commission shall evaluate proposals to determine whether the proposed plan:

a. Protects and preserves all floodplains, wetlands, and steep or unstable slopes from clearing, grading, filling, or construction (except as may be approved by the city for essential infrastructure or active or passive recreation amenities).

b. Preserves and maintains mature woodlands, existing fields, pastures, meadows, and orchards, and creates sufficient buffer areas to minimize conflicts between residential and agricultural uses. For example, locating house lots and driveways within wooded areas is generally recommended, with two exceptions. The first involves significant wildlife habitat or mature woodlands that raise an equal or greater preservation concern, as described in Items "e and h", below. The second involves predominantly agricultural areas, where remnant tree groups provide the only natural areas for wildlife habitat.

c. If development must be located on open fields or pastures because of greater constraints in all other parts of the site, dwellings should be sited on the least prime agricultural soils, or in locations at the far edge of a field, as seen from existing public roads. Other considerations include whether the development will be visually buffered from existing public roads, such as by a planting screen consisting of a variety of indigenous native trees, shrubs, and wildflowers.

d. Maintains or creates an upland buffer of natural native species vegetation of at least one hundred (100) feet in depth adjacent to wetlands and surface waters, including creeks, streams, springs, lakes and ponds.

e. Designs around existing hedgerows and treelines between fields or meadows, and minimizes impacts on large woodlands, (greater than five (5) acres), especially those containing many mature trees or a significant wildlife habitat. When any woodland is developed, great care shall be taken to the fullest extent that is practicable to design all disturbed areas (for buildings, roads, yards, septic disposal fields, etc.), in locations where there are no large trees or obvious wildlife areas.

f. Leaves scenic views and vistas unblocked or uninterrupted, particularly as seen from public thoroughfares. For example, in open agrarian landscapes, a deep "no-build, no-plant" buffer is recommended along the public thoroughfare where those views or vistas are prominent or locally significant. The concept of "foreground meadows," with homes facing the public thoroughfare across a broad grassy expanse is strongly preferred to mere buffer strips, with or without berms or vegetative screening. In wooded areas where the sense of enclosure is a feature that should be maintained, a deep "no-build, no-cut" buffer should be respected, to preserve existing vegetation.

g. Protects wildlife habitat areas of species listed as endangered, threatened, or of special concern by the U.S. Environmental Protection Agency or the Tennessee Department of Environment and Conservation.

h. Designs around and preserves sites of historic, archaeological, or cultural value, including stone walls, spring houses, barn foundations, cellar holes, earthworks, and burial grounds and their environs, insofar as needed to safeguard the character of the feature.

i. Protects rural roadside character and improves public safety and vehicular carrying capacity by avoiding development fronting directly onto existing public roads. Establishes buffer zones along the scenic corridor of rural roads with historic buildings, stone walls, hedgerows, etc.

j. Landscapes common areas (such as community greens), cul-de-sac islands, and both sides of new streets with native specie shade trees and flowering shrubs with high wildlife conservation value. These trees shall generally be located between the sidewalk or footpath and the edge of the street, within a planting strip not less than five (5) feet in width.

k. Provides active recreational areas in suitable locations that offer convenient access by residents and adequate screening from nearby house lots.

l. Includes a pedestrian circulation system designed to assure that pedestrians can walk safely and easily on the site, between properties and activities or special features within the neighborhood open space system. All roadside footpaths should connect with off-road trails, which in turn should link with potential open space on adjoining undeveloped parcels.

m. Provides open space that is reasonably contiguous. To the greatest extent practicable this land shall be designed as a single block with logical, straightforward boundaries. Long thin strips of conservation land shall be avoided, unless the conservation feature is linear or unless such configuration is necessary to connect with other streams or trails. The open space shall generally abut existing or potential open space land on adjacent parcels (such as in other subdivisions, public parks, or properties owned by or leased to private land conservation organizations). Such subdivision open space shall be designed as part of large contiguous and integrated pedestrial, bikeway and greenway systems.

4-102.103 Lots Subject to Flood

No portion of a "building envelope" (see definition) associated with any residential structure may be located in any flood prone area. However, portions of lots that are located beyond a "building

envelope" may contain land subject to flooding but not within the designated "floodway". In any instance where the lot is served by subsurface sewage disposal, the area of the disposal fields shall not lie within any flood prone area. Adding fill material within the one hundred-year flood boundary area will not be permitted unless approved by the planning commission and all necessary permits are on file with the Enforcing Officer. In the event that filling within the flood boundary is approved, the fill shall be protected against erosion by rip-rap, vegetative cover, or other methods deemed acceptable by the planning commission.

On nonresidential building sites within a one hundred-year flood boundary the use of structural floodproofing methods specified in Appendix "C", Storm Water Design Guidelines, of these regulations, as an alternative to fill material, may be approved by the Enforcing Officer, as provided in Subsections 4-101.403 and 2-101.4, of these regulations.

4-102.104 Lots with Building Sites Located on Steep Slopes

Due to the potential threat to health and safety posed by development located on lands with slopes in excess of fifteen (15) percent, the following regulations shall apply:

a. **Site Development Plan Required** -- No building permit may be issued for a building or any lot where the proposed "building envelope" lies on natural slopes of twenty (20) percent or greater. For any lot where the proposed building envelope has slopes of less than twenty (20) percent but fifteen (15) percent or greater a site plan meeting the following requirements must be approved by the planning commission prior to issuance of a building permit. Said site plan shall show:

   (i) The exact size, shape, and location of the lot,

   (ii) The proposed location of all buildings, driveways, drainageways, and utilities,

   (iii) Proposed contours at vertical intervals of no more than five (5) feet,

   (iv) The extent of natural tree cover and vegetation,

   (v) The location of any on-site soil absorption sewage disposal systems,

   (vi) The type and location of erosion control facilities.

   (vii) A building foundation plan,

   (viii) The stamp of the Tennessee registered engineer who prepared the plan,

(ix) Certification by a Tennessee registered engineer with competence in the field of geotechnics as to the stability of the foundations and structures and compliance with sound construction methods for areas with steep slopes and landslide problems.

b. **Site Development Standards** -- The following standards shall be used as a guide in determining the suitability of the construction proposed for the particular site in question. The engineer's certification required in Subsection 4-102.103, a, (ix), above, shall address these standards.

(i) Natural vegetation shall be preserved to the maximum extent possible,

(ii) Natural drainageways and systems shall be maintained, except that surface water may be diverted around a house or slope area to a natural drain using acceptable construction techniques,

(iii) Operations that increase loads, reduce slope support, and cause instability of the slope shall be prohibited to the maximum extent possible. These methods include filling, irrigation systems, accessory buildings, and on-site soil absorption sewage disposal systems,

(iv) Where sanitary sewers are not available all on-site sewage disposal systems shall be shown on the site plan and located to avoid slide-prone areas.

(v) Erosion control measures shall be employed to prevent soil from leaving the site. Additionally, soil from excavation on the site shall not be deposited as fill on a potential slide area,

(vi) No construction that would cut the toe of the slope shall be permitted. This shall apply as well to subdivision roads constructed in compliance with these regulations.

4-102.2 Lot Dimensions

Except as provided in Subsection 4-102.3, Special Building Separation, minimum dimensions of lots shall comply with the standards of the zoning ordinance. All building setbacks and the “building envelope” shall be indicated for each lot shown on the plat.

Where lots are more than double the minimum area required by the zoning ordinance the planning commission may require that such lots be restricted to prevent further resubdivision or be arranged so as to allow further subdivision and the opening of future public ways where they would be necessary to serve such potential lots, all in compliance with the zoning ordinance and these regulations.

Dimensions of corner lots shall be large enough to allow for erection of buildings, observing the minimum front yard setback requirements from both public way rights-of-way.

The minimum lot frontage on a public way shall be fifty (50) feet, except for the radius of a cul-de-sac that shall be thirty-five (35) feet.

Depth and width of properties reserved or laid out for business, commercial, or industrial purposes shall be adequate to provide for the off-street parking and loading facilities required for the type of use and development contemplated as established in the zoning ordinance.

4-102.3 Special Building Separation

In all instances where fire flows are inadequate to meet the requirements of these regulations or no fire hydrant is located within sufficient distance to meet the fire protection standards established herein, the minimum separation of principal buildings shall at all points be fifty (50) feet.

4-102.4 Building Setbacks from High Voltage Electric Lines

In the case of electric transmission lines where easement widths are not definitely established, a minimum building setback line from the center of the transmission line shall be established as follows:

Voltage of Line	Building Setback
7.2 KV	15 feet
13 KV	25 feet
46 KV	37 1/2 feet
69 KV	50 feet
161 KV	75 feet

4-102.5 Double Frontage Lots and Access to Lots

4-102.501 Double Frontage Lots

Double frontage and reversed frontage lots shall be avoided, except where necessary to provide separation of residential development from traffic arteries, or to overcome specific disadvantages of topography and orientation.

4-102.502 Access from Arterial or Collector Public Ways

The planning commission may require that lots shall not derive access exclusively from arterial or collector public ways. Where driveway access from such public ways may be necessary for several adjoining lots, the commission may require that the lots be served by a combined access drive in order to limit possible traffic hazards. Driveways shall be designed and arranged so as to avoid requiring vehicles to back onto arterial or collector streets. (A note to this effect shall placed upon the final plat in any instance where joint or shared drives are required.)

4-102.503 Minimum Clearance

The minimum corner clearance between proposed new driveways and arterial or collector routes designated in the Major Thoroughfare Plan shall be fifty (50) feet. In order to ensure adequate storage space for vehicles stopped at a signalized intersection, the planning commission may require that the nearside corner clearance shall be at least one hundred (100) feet.

Corner clearances and design of driveway connections to arterial and collector roads shall be as defined in the Rules and Regulations for Constructing Driveways on State Highway Rights-of-Way, adopted by the Tennessee Department of Highways, April 3, 1967, including all subsequent amendments and/or revisions thereto.

The distance between a frontage property line and the tangent projection of the nearest edge of each nonresidential driveway, measured along the edge of the public way, shall be at least fifteen (15) feet.

4-102.504 Design Standards for Nonresidential Driveways

For access to thoroughfares where the posted speed limit is 35 m.p.h. or less, all nonresidential driveways shall be constructed with a minimum return radius of fifteen (15) feet and a minimum horizontal width of twenty-five (25) feet. All drives serving nonresidential property shall be paved with concrete or an asphaltic surface.

For access to thoroughfares where the posted speed limit is 40 m.p.h., nonresidential driveways shall be constructed with:

a. a minimum return radius of fifteen (15) feet and a minimum driveway width of thirty-five (35) feet; or

b. a minimum return radius of twenty (20) feet and a minimum driveway width of thirty (30) feet; or

c. a minimum return radius of twenty-five (25) feet and a minimum driveway width of twenty-five (25) feet.

For access to thoroughfares where the posted speed limit is 45 m.p.h., nonresidential driveways shall be constructed with a right turn deceleration lane and:

a. a minimum return radius of twenty-five (25) feet and a minimum driveway width of forty (40) feet; or

b. a minimum return radius of thirty (30) feet and a minimum driveway width of thirty (30) feet.

The planning commission will review proposed driveway designs for access to other thoroughfares on a case by case basis.

The centerline of every nonresidential two (2) way driveway shall intersect the centerline of the public way at an angle between seventy-five (75) and ninety (90) degrees.

For other nonresidential driveways, the intersection angle shall be subject to the approval of the planning commission.

4-102.505 Design Standards for Residential Driveways

Where permitted, residential driveways fronting collector and arterial routes designated in the Major Thoroughfare Plan shall be designed so as to avoid requiring vehicles to back onto these highways. Any driveway shall be constructed in a manner such that the drive has a maximum slope of eight (8) percent for the first fifteen (15) feet (measured from the right-of-way). Where the potential exists for gravel or soil to be washed from a driveway onto the public right-of-way such driveways shall be paved or otherwise stabilized for a distance sufficient to prevent material from migrating onto public property.

4-102.506 Relationship to State Standards

Where the driveway design and location standards listed above are not in conformance with the standards of the Tennessee Department of Transportation, the planning commission may require conformance with whichever standard is more restrictive.

4-102.6 Soil Preservation, Grading, Erosion Control, and Seeding

4-102.601 Soil Preservation and Final Grading

No certificate of occupancy shall be issued until final grading has been completed in accordance with the approved construction plan.

Topsoil shall not be removed from residential lots or used as spoil, but shall be redistributed so as to provide cover on the lots.

Permanent or temporary soil stabilization shall be applied to denuded areas within fifteen (15) days after final grade is reached on any portion of the site. Soil stabilization shall also be applied within fifteen (15) days to denuded areas that may not be at final grade.

4-102.602 Lot Drainage

Lots shall be laid out so as to provide positive drainage away from all buildings. Drainage of individual lots shall be coordinated with the existing or proposed general storm drainage pattern for the area.

Drainage shall be designed so as to avoid concentration of storm water from each lot to adjacent lots, except within drainage easements or street rights-of-way. Surface water drainage patterns for each and every lot shall be shown on the road and drainage plans. Drainage flow and conveyance arrows shall be indicated on the topographic grading and drainage plan.

It shall be the responsibility of the builder of any building or other structure to design and construct a suitable drainage scheme that will convey surface water, without ponding on the lot or under the building, to the drainage system constructed within the subdivision.

The Enforcing Officer reserves the right to require that the developer set minimum elevations on all floors, patios, and building equipment. This prerogative to establish elevation exists in addition to any ordinances or provision of these regulations that refer to floodplain elevation requirements. This provision is intended to give the planning commission summary review powers over any calculated or historical evidence of storm water presence in overland or channel conditions. All finished floor elevations of buildings shall be at an elevation at least two (2) feet above the 100-year regulatory flood elevation when located within a floodplain area.

The subdivision developer will insure that all artesian ground waters of a permanent or temporary nature encountered within the right-of-way will be intercepted and carried away to primary drainage conduits along swaled ditches or in underground pipes located on property line easements. Regardless of the location of property lines, intercept will be allowed at the point of artesian surfacing.

Any sinkhole or natural channel which serves or has served as a means of moving or storing ground water, including all designated floodways, shall be designated conservation and drainage easements and shall have a dedicated twenty-five (25) foot wide buffer area around the perimeter of such sinkhole or natural drainage channel. No structures, fill or development activity shall be permitted thereon.

4-102.603 Erosion and Sediment Control

There shall be a minimization of changes in the rate of natural erosion and sedimentation that result from the development process. An erosion and sediment control plan shall be presented with the construction plans submitted in conformance with Section 5-102, of these regulations. Such plans shall incorporate the following principals:

a. clearing and grading shall be integrated with layout design;

b. clearing shall be minimized and existing vegetation shall be preserved to the maximum feasible degree;

c. grading shall be strictly limited to those areas located within the “building envelope” (see definition) and the driveway of the lot;

d. disturbed areas shall be protected and stabilized as provided in Subsection 4-102.601 (Soil Preservation and Final Grading).

e. structural and vegetative measures to control the velocity and volume of runoff shall be required;

f. sediment basins and traps shall be required as necessary and shall be separate from detention facilities;*

NOTE: If sediment basins are designed to be located on lots or areas designated as "For Sale" a note shall be added to the final plat restricting the sale of these areas until the sediment area is no longer required.

g. adequate maintenance of all planting and structural measures shall be assured, both within areas proposed for public dedication and upon proposed lots.

h. erosion control plans may be required for individual lots.

All properties adjacent to the site of land disturbance shall be protected from sediment disposition. This may be accomplished by preserving a well-vegetated buffer strip around the lower perimeter of the land disturbance; by installing perimeter controls such as sediment barriers, filters, dikes or sediment basins; or by a combination of such measures.

4-102.8 Debris and Waste

No cut trees, timber, construction debris, junk, rubbish, or other waste materials of any kind shall be buried in any land left on any lot or deposited in any natural drainageway (such as sinkholes, underground streams or channels, or wet weather stream beds or floodways) or public way at the time of the issuance of a certificate of occupancy for the lot, and removal of such waste shall be required prior to issuance of any certificate of occupancy. Neither shall any such waste be left nor deposited in any area of the subdivision at any time. Debris dumpsters shall be required for construction debris disposal. Such dumpsters shall be of adequate size and shall be removed in a timely manner. No debris burning of any type shall be allowed within the subdivision.

4-102.8 Fencing

Each subdivider or developer shall be required to furnish and install all fences wherever the planning commission determines that a hazardous condition exists. Such fences shall be constructed according to standards established by the planning commission, as appropriate, and shall be noted on the final plat as to height and required materials.

4-102.9 Water Bodies and Watercourses

If a tract being subdivided contains a water body, or portion thereof, such area shall generally be located within jointly held open space. The planning commission may approve an alternative plan whereby the ownership of and responsibility for safe maintenance of the water body is so placed that it will not become a governmental responsibility.

No portion of the minimum area of a lot required under any zoning ordinance may be satisfied by land which is under water. Where a watercourse separates a buildable area of a lot from the public way to which such lot has access, provisions shall be made for installation of a culvert of adequate overflow size or other structure approved by the planning commission. No certificate of occupancy shall be issued for a structure on such a lot until the installation is completed and approved by the planning commission and/or the appropriate governmental representative.

4-102.10 Blocks

1. Blocks shall have sufficient width to provide for two (2) tiers of lots of appropriate depth. Exceptions to this prescribed block width may be permitted in blocks adjacent to major public ways, railroads, or waterways.

2. The lengths, widths, and shapes of blocks shall be determined with due regard to:

   (a) provision of adequate building sites suitable to the special needs of the type of use contemplated;

   (b) any zoning requirements as to lot sizes and dimensions;

   (c) needs for convenient access, circulation, control, and safety of vehicular and pedestrian traffic; and

   (d) limitations and opportunities of topography.

3. Block lengths in residential areas shall not exceed twelve hundred (1,200) feet, except as the planning commission deems necessary to secure efficient use of land or desired features of the public way pattern. Wherever practicable, blocks along arterial or collector routes shall not be less than eight hundred (800) feet in length.

4. Blocks designed for industrial or commercial uses shall be of such length and width as may be deemed suitable by the planning commission.

5. In any long block, the planning commission may require the reservation of an easement through the block to accommodate utilities, drainage, facilities, and/or pedestrian traffic.

4-103 Streets and Pedestrian Ways

4-103.1 Pedestrian Ways

4-103.101 Sidewalks Along New Streets

Sidewalks shall be required along all “urban” streets (see Table 1) constructed in all subdivisions except those proposed for industrial use.

Sidewalks may not be required along streets designated as “rural” when all lots fronting such streets are forty thousand (40,000) square feet or larger in size and have average road frontage of one hundred fifty (150) feet or more.

4-103.102 Sidewalks Along Existing Streets

Sidewalks may be required along an existing public street when sidewalks presently exist upon property that directly adjoins the proposed subdivision, are included within a plan for pedestrian ways or the reconstruction of the existing street is required by an approved traffic impact study.

4-103.103 Location of Sidewalks

Sidewalks shall be required along one side of all streets designated as “residential access lanes or urban residential access streets”. Along streets designated as “urban residential collector or community collector” streets” sidewalks shall be required along both sides. When sidewalks are to be constructed in a subdivision adjoining a developed area with sidewalks, the sidewalks shall be joined and extended along the same side of the street. Transition of sidewalks from one side of a street to another may be permitted when topography makes continuation along the same side of the street impractical. Transitions shall only be made at street intersections. In residential zone districts, sidewalks will not be required on permanent dead-end streets less than three hundred (300) feet in length.

Sidewalks shall be included within the dedicated non-trafficway portion of the right-of-way of all public ways. Concrete curbs are required for all public ways where sidewalks are to be constructed. A median strip of grassed or landscaped area at least five (5) feet wide shall separate all sidewalks from adjacent curbs, except within ten (10) feet of intersections no grass strip will be required. No sidewalk shall be constructed closer than one (1) foot from any lot line. Where extraordinary difficult topographic conditions would require a retaining wall more than three (3) feet in height and other design solutions such as a wider separation are not desirable, the planning commission may allow less than a five (5) foot but not less than a two (2) foot landscape area between the back of the street curb and the nearest edge of the sidewalk.

4-103.104 Sidewalk Width

The width of sidewalks shall be as follows. Width shall be exclusive of encroachments such as utility poles, fire hydrants, parking meters, sign standards, street furniture, etc.

SIDEWALK WIDTH

Street Classification	Land Use Classification		
	Residential	Commercial	Industrial
Access Lane	5 feet	N/A	N/A
Access Street	5 feet	5 feet	N/A
Residential Collector	5 feet	N/A	N/A
Community Collector	5 feet	6 feet	6 feet
Arterial Public Way	5 feet	6 feet	6 feet

4-103.105 Alternative Pedestrian Ways

Within PUD Districts and developments approved under Section _____ (cluster) _____, of the zoning ordinance, the planning commission may approve pedestrian walkways at locations other than along the rights-of-way of streets. Within these developments a system of pedestrian walkways may be located within commonly held open space

4-103.106 Pedestrian Accesses

Where necessary, pedestrian accessways may be required from a public way to schools, parks, playgrounds, or other nearby public ways. To accomplish this purpose, the planning commission may require perpetual unobstructed easements at least twenty (20) feet in width.

4-103.2 Street Standards

4-103.201 Frontage on Improved Public Ways

No subdivision shall be approved, unless the area to be subdivided shall meet the access requirements set forth in Subsection 1-112.107, (Access to Lots by Public Way or Private Easement) of these regulations. If any new street construction is proposed, all construction shall be in accordance with the provisions of these regulations and accompanying appendices.

4-103.202 Grading and Improvement Plan

No clearing, grading or construction of streets shall begin until construction plans, prepared in accordance with the specifications required herein, are approved, reclamation or performance surety posted and a grading permit issued by the Enforcing Officer. Following approval of such plans and accompanying development agreement, public ways shall be graded and improved to conform to the approved construction plans.

4-103.203 Improvements in Floodable Areas

The finished elevation of proposed public ways subject to flood shall be no less than the regulatory flood protection elevation. To determine compliance with this requirement the planning commission shall require

profiles and elevations of public ways subject to flood. All drainage structures shall be sufficient to discharge flood flows without increasing flood height. Where fill is approved by the planning commission to bring the finished elevation of any public way to the required elevation, such fill shall not encroach upon a floodway, and the fill shall be protected against erosion by rip-rap, vegetative cover, or other methods deemed acceptable by the planning commission.

4-103.204 Topography and Arrangement

a. All public ways shall be arranged so as to obtain as many of the building sites as possible at or above the grades of the public ways. Grades of public ways shall conform as closely as possible to the original topography. A combination of steep grades and curves shall not be permitted.

b. All public ways shall be properly integrated with the existing and proposed system of public ways and dedicated rights-of-way as established on the major road plan or the land development plan.

c. All public ways shall be properly related to special traffic generators, such as industries, business districts, schools, churches, and shopping areas or centers; of population density; and to the pattern of existing and proposed land use.

d. In commercial and industrial developments, public ways and other access routes shall be planned in connection with the grouping of buildings, location of rail facilities, and the provision of alleys, truck loading and maneuvering areas, pedestrian walks and parking areas, so as to minimize conflict of movement among the various types of traffic, including pedestrian traffic.

4-103.205 Access to Arterial and Collector Routes

Where a subdivision borders on or contains an existing or proposed arterial or collector route, the planning commission may require that access to such public way be limited by:

a. the configuration of subdivision lots so that such lots derive vehicular access from streets other than the arterial or collector route;

b. a series of cul-de-sac, "U" shaped public ways, or short loops entered from and designed generally at right angles to such a parallel public way; or

c. a marginal access or service public way, separated from the arterial or collector route by a planting or grass strip and having access thereto at suitable points.

4-103.206 Traffic Impact Study

Any subdivision containing lots for one hundred (100) or more dwelling units shall be required to prepare at the expense of the developer or individual proposing the subdivision a traffic impact study. At the discretion of the Enforcing Officer, any subdivision may be required to prepare a traffic impact study. A Tennessee licensed engineer experienced in "traffic engineering" shall prepare such study in accordance with standard practices and procedures. The traffic study is intended to provide information as to current and proposed or projected traffic levels along all streets touching, immediately abutting or directly impacted by the subdivision. Prior to development of the study, the applicant and/or the individual selected by the developer to prepare the study shall meet with the Enforcing Officer for purposes of establishing scope and design parameters to be used in preparing such study. Any improvements proposed to offset the traffic impact of the subdivision shall be indicated.

4-103.207 Reserve Strips

Creation of reserve strips adjacent to a proposed public way in such a manner as to deny access from adjacent property to such public way shall generally not be permitted. However, where in the opinion of the planning commission the use of a reserve strip would protect the public safety by providing a safer roadway configuration or other element of design that is clearly in the public interest, this prohibition may be waved. In any instance where a wavier to this provision is granted the grounds for and extent of such wavier shall be noted in the minutes of the planning commission.

4-103.208 Street Name, Regulatory and Warning Signs

a. **Public Streets** – Within all subdivisions the developer shall purchase and install street name and traffic control signs. All signage shall conform to the current edition of the Manual of Uniform Traffic Control Devices published by the United States Department of Transportation. Temporary signs may be installed and maintained in lieu of permanent signs until curbs are installed and backfilled. Such signs shall meet the same standards for height, size and legibility as permanent signs but may be mounted on temporary structures. The Director of Public Works shall verify the installation of temporary street name signs prior to issuance of any building permit.

b. **Private Streets** - The developer shall purchase and install appropriate street name and traffic control signs. Written confirmation of this action shall be required prior to issuance of any building permit or filing of a final plat.

c. **Note to Appear on Plat** - All subdivision plats which require street name signs shall have a note located thereon stating:

"No building permit shall be issued for any lot shown on this plat until street name, regulatory and warning signs are installed and verified by the Department of Public Works."

4-103.209 Designation of Construction Routes

Streets to be utilized as construction routes shall be designated within all "major subdivisions", as the term is defined in these regulations. Where possible, these construction routes shall coincide with the network of collector and arterial routes designated upon the Major Thoroughfare Plan and within the plan of development for the particular subdivision. Where this is not possible, efforts shall be made to minimize direct contact between designated construction routes and streets classified as "Residential Access Lanes" or "Residential Access Streets".

4-103.3 Private Streets

4-103.301 Generally

Where the ownership, control and maintenance of any street is proposed to remain in private ownership, such street shall be constructed to the design and construction standards as herein provided. A permanent access easement over such streets shall be provided to each and every parcel or lot that is to gain access therefrom. All such private improvements shall be maintained by the developer/owner or by a legally established Homeowners' Association or other similar group approved by the planning commission. The legal documents establishing ownership and maintenance of the easement shall be submitted with the final plat for review and approval and shall be recorded with the final plat.

4-103.302 Private Streets Serving as Sole Access

In any instance where a private street serves as the sole means of vehicular access to more than one lot such street shall be constructed to the standards established in these regulations for the appropriate street classification.

4-103.303 Private Streets Serving as Secondary Access

In any instance where a private street serves as other than a sole means of vehicular access to more than one lot, such accessway shall be at least twenty (20) feet in width and shall be paved with an all weather surface. Prior to approving any such route the planning commission shall be provided with a maintenance agreement that is sufficient to assure that such accessway will be maintained so as to provide adequate emergency access to all properties served by such accessway.

4-103.304 Within Planned Unit Developments

Private streets located within a Planned Unit Development shall conform to the following provisions:

a. All hardware such as catch basins, inlets, etc. and all drainage structures shall meet the standards set forth herein and in other design standards adopted by the city.

b. All curbs shall meet or exceed the standards set forth in these regulations for public streets. Subject to approval of the Enforcing Officer, materials may be varied to conform to alternative materials chosen for private streets.

c. Pavement and base thickness shall equal or exceed the load bearing capacity, cross sectional area, structural integrity and life expectancy of public streets specified herein. Subject to the requirements of this section and approval of the Enforcing Oficer, alternative road construction surfacing materials such as concrete (including exposed aggregate) and pavers may be utilized.

d. Excepting lots proposed for occupancy by single-family houses, all vehicular access shall be shown on the plat, and the design elements shall be approved by the Enforcing Officer.

e. Parking bays may generally be permitted upon or adjoining private streets, provided that in all instances an open unobstructed travel way sufficient to provide access for emergency vehicles is maintained.

4-103.305 Within All Other Residential Districts

Private streets serving residential properties located within districts other than Planned Unit Development Districts shall conform to the following provisions.

a. A private street or network of streets may serve no more than ten (10) lots.

b. All private streets serving two (2) or more lots shall as a minimum be constructed to the standards specified in these regulations.

4-103.4 Requirements for Dedications, Reservations, or Improvements

Where a proposed subdivision adjoins or encompasses either a substandard street, or a route depicted upon the Major Thoroughfare Plan, that is to be opened, widened or realigned, the following shall apply.

4-103.401 Undeveloped Property

a. Substandard Streets

Substandard streets encompassed by or adjacent to the proposed subdivision shall be improved by the developer in accordance with the minimum standards set forth in Subsection 4-104.4, Tables 1 and 2, for the portion of such street that is located within the boundaries of the subdivision or the abutting street half.

b. Planned Routing

When applicable, the layout of a street(s) within a subdivision shall conform to the routing depicted upon the Major Thoroughfare Plan. The amount of right-of-way for the type of street required shall be dedicated up to a maximum of that required for construction of "Community Collector" routes. Where any street so depicted requires a right-of -way greater than that required for construction of a Community Collector, the developer shall show on the face of the plat an additional area "reserved for future right-of way" and any required yard area shall be measured from such reservation line.

4-103.402 Developed Property

When property containing existing structures is being divided simply to place each structure on a separate lot and the future right-of-way will fall within the footprint of an existing structure, then the subdivider shall be required to note on the face of the plat as, "reserved for future right-of-way" any additional area necessary for compliance with the Major Thoroughfare Plan. The plat shall also contain a note stating, when any existing structure is demolished, the setback requirements for any new structure shall be measured from the reservation line.

4-103.403 Required Improvements or Dedications

All on-site traffic improvements identified as being required in a traffic study prepared in accordance with the requirements of these regulations shall be made by the developer upon land which the developer controls. Any off-site improvements identified in such study shall be made on a pro-rata basis to the extent the subdivision contributes to the requirement for such improvement(s). The Enforcing Officer shall be responsible for calculating the extent of participation required in off-site improvements.

4-104 Functional Design Criteria

4-104.1 Purpose

The public way design standards set forth in this section are hereby required in order to provide public ways of suitable location, width, and improvement to accommodate prospective traffic and afford satisfactory access to police, fire-

fighting, sanitation, and road-maintenance equipment, and to coordinate public ways so as to compose a convenient and safe system and avoid undue hardships to adjoining properties. These provisions are intended to establish appropriate standards for the design of streets in residential subdivisions that will:

1. Promote the safety and convenience of vehicular traffic,

2. Protect the safety of neighborhood residents,

3. Minimize crime in residential areas,

4. Protect the residential qualities of neighborhoods by limiting traffic volume, traffic speed, noise and fumes,

5. Encourage the efficient use of land,

6. Minimize the cost of street construction and thereby restrain the rising cost of housing, and

7. Minimize the construction of impervious surface thereby protecting the quantity and quality of the community's water resources.

4-104.2 Design Hierarchy

There is, hereby, established a design hierarchy according to street function. The purpose of the hierarchy is to establish clear functional guidelines and limitations to be utilized in the design of streets.

4-104.201 New Streets

Each proposed street shall be classified and designed for its entire length to meet or exceed the minimum standards for one of the following street types:

STREET CLASSIFICATION	DESIGN CAPACITY (ADT)
Residential Access Lane	200
Residential Access Street	500
(1) Rural Residential Access Street	
(2) Urban Residential Access Street	
Residential Collector Street	1,000 – 2,500
(1) Rural Residential Collector Street	
(2) Urban Residential Collector Street	
Community Collector Street	2,500 – 6,000
Arterial Street	6,000+

4-104.202 Existing Streets

During the plan review process each street abutting or affecting the design of a subdivision or land development that is not already classified on the Major Thoroughfare Plan shall be classified according to its function, design and use by the planning commission at the request of the applicant. The classification of existing streets shall include the hierarchy of Subsection 4-104.201, above, and may also include classifications of higher order as determined by the adopted Major Thoroughfare Plan.

4-104.203 Traffic Volume Calculations

a. Trip Generation Rates

The following chart shall be used to determine the anticipated average daily traffic level of proposed residential development:

HOUSING TYPE	AVERAGE WEEKDAY TRIP GENERATION RATES (ADT) PER DWELLING UNIT
Single-Family Detached Dwellings	8 trips
Cluster or Town Houses	7 trips
Garden Apartments (1-4 Story)	6 trips
Retirement Complex	3.5 trips

b. Volume Calculations

Calculation of traffic volumes shall be accomplished by using the following formula:

(Factor for Dwelling Type) x (Number of Units Receiving Access from Street) = Design ADT

4-104.3 Residential Street Design Criteria and Service Restrictions

The material contained within this segment is intended to provide information as to the intended function, design capacity and service limitations of the various street types presented in Subsection 4-104.2, above. The order of presentation proceeds from smallest capacity street to the greatest. For each street identified within the hierarchy, the following design elements are presented:

- Street Function
- Design Capacity and Service Restrictions
- Street Access Criteria

4-104.301 Residential Access Lane

a. **Street Function** - A residential access lane is a frontage street that provides access to abutting properties; it shall be designed to carry no more traffic than that generated by those properties that gain direct access from the street.

b. **Design Capacity and Service Restriction** - Each residential access lane shall be designed so that no section of the street conveys an average daily traffic (ADT) volume greater than two hundred (200) or serves more than twenty-five (25) single family dwellings. Each half a loop street may be regarded as a single local access street and the total traffic volume generated on a loop street shall not exceed four hundred (400) ADT.

c. **Street Access** - Residential access lanes may intersect or take access from any street type. Both ends of a loop street, however, must intersect the same collecting street and be laid out to discourage through traffic.

4-104.302 Residential Access Street

a. **Street Function** - Residential access streets are designed to provide access to individual properties as well as access to the higher classification street network. The residential access street provides for neighborhood circulation and may carry neighborhood traffic and through movements. Residential access streets differ in design depending upon the location of such streets. The rural residential street is intended to maintain the rural character of the area or neighborhood. It is designed as a curbless paved street section, with gravel shoulders for emergency parking and open roadside ditches for drainage. The urban residential street performs the same function as the rural residential street except within an urban environment. The urban residential street is designed as a curb street.

b. **Design Capacity and Service Restriction** - The residential access street is designed to convey an average daily traffic (ADT) volume in the range of five hundred (500) to one thousand (1,000).

c. **Street Access** - If the total design traffic exceeds five hundred (500) ADT, a residential access street shall be provided with no fewer than two (2) access intersections to streets of higher classification in the street hierarchy. For residential access streets with less than five hundred (500) ADT, one access intersection to a street of higher order is allowed.

4-104.303 Residential Collector Street

a. **Street Function** - The residential collector street provides access to individual properties and collects and distributes neighborhood traffic from residential streets to community collector and arterial streets.

b. **Design Capacity and Service Restriction** - The residential collector street is intended to serve anticipated traffic volumes ranging from one thousand (1,000) to twenty-five hundred (2,500) trips per day. Whenever possible, residential collector streets shall

be designed to have no residential lots fronting directly on them. When this is not possible, the amount of residential frontage shall not exceed the limits set forth in the accompanying chart. In addition, only lots having frontages of one hundred (100) feet or more may front on collector streets and space shall be provided on these lots for turnaround so that vehicles will not have to back onto collector streets.

PERCENT OF THE TOTAL LENGTH OF RESIDENTIAL COLLECTOR STREETS, WHICH MAY HAVE RESIDENTIAL LOTS FRONTING ON AND TAKING ACCESS FROM THE COLLECTOR STREET

ADT Level	1000-1999	1200-1599	1600-1999	2000+
% of allowable access frontage	20%	10%	5%	0%

4-104.304 Community Collector Street

a. **Street Function** - Community collector streets collect and distribute traffic from residential collector and other residential streets to the arterial transportation systems.

b. **Design Capacity and Service Restriction** - The community collector street is designed for anticipated traffic volumes ranging from twenty-five hundred (2,500) to six thousand (6,000) trips per day. Community collector streets shall be designed to have no residential lots fronting directly on them.

4-104.4 General Design

The general design of all public ways shall conform to the standards in Tables 1 and 2, that follow, hereafter.

4-104.401 Rights-of-Way and Pavement Width

Minimum rights-of-way and pavement width shall be provided as required to meet the design standards for the various classifications of streets set out in Tables 1 and 2.

a. Reduction in Right-of-Way Width

The city may reduce the required right-of-way width for residential streets under the following conditions:

(i) The site is located within a Planned Unit Development or a Variable Lot Size Residential Development under applicable provisions of the zoning ordinance.

TABLE 1

MINIMUM RIGHT-OF-WAY OR EASEMENT AND PAVEMENT WIDTH (in feet) BY STREET TYPE AND INTENSITY OF DEVELOPMENT

	RESIDENTIAL		NONRESIDENTIAL	
	Right of way	Pavement	Right of way	Pavement
Access Lane				
Urban[b]	40[c]	20	N/A	N/A
Rural[b]	40[c]	20	N/A	N/A
Access Street				
Urban	50	22	50	36
Rural	50	20	50	36
Residential Collector				
Urban				
2,000 or less ADT.	50	22	60	38
More than 2,000 ADT	50	24	60	40
Rural				
2,000 or less ADT.	50	20	N/A	N/A
More than 2,000 ADT	50	22	N/A	N/A
Collector				
Urban	60	38	70	48
Rural	50	24	N/A	N/A

Notes:

a. DUPA = Dwelling Units per Acre

b. **Urban Streets** - All streets classified as urban are curbed streets. These street sections are to be utilized on all properties located within the city regardless of size of lots and on all lots smaller than one acre in size located within the unincorporated portion of the planning jurisdiction.

Rural Streets - Streets classified as rural may be utilized only to serve lots forty thousand (40,000) square feet or larger in size.

TABLE 2

GENERAL DESIGN STANDARDS FOR STREETS

	RESIDENTIAL STREET	NONRESIDENTIAL STREET
Design Speed (MPH)		
Residential Access Lane	25	N/A
Residential Access Street	30	30
Residential-Collector Street	35	35
Collector Street	40	40
Maximum Percentage Grade		
Residential Access Lane	12%	N/A
Residential Access Street	10%	10%
Residential-Collector Street	7%	7%
Collector Street	7%	7%
Minimum Percentage Grade		
All Streets	1%	1%
Maximum Super-Elevation (foot/foot)	0.08	0.08
Minimum Stopping Sight Distances (in feet)		
Residential Access Lane	150	N/A
Residential Access Street	200	200
Residential-Collector Street	250	250
Collector Street	300	300
Minimum Radius of Return at Intersections		
At Right-of-Way	25 ft.	30 ft.
At Pavement	30 ft.	50 ft.

TABLE 2 (Continued)

GENERAL DESIGN STANDARDS FOR STREETS

	RESIDENTIAL STREET	**NONRESIDENTIAL STREET**
Minimum Sight Distance (in Feet)*		
Residential Access Lane	150	N/A
Residential Access Street	200	200
Residential-Collector Street	250	250
Collector Street	375	375
Maximum Grade At Intersections		
Residential Access Lane (Within 50 ft.)	5%	N/A
Residential Access Street (Within 50 ft.)	5%	5%
Residential -Collector Street	3%	3%
Collector Street (Within 100 ft.)	3%	3%
Pavement Crown		
The paved surface shall slope downward from the centerline of the street outward to the edge of the paved surface on each side at a rate of 2%.		
Turnaround Standard (No Outlet Streets) A forty (40) foot pavement radius for a cul-de-sac or a "Y" or "T" turnaround with sixty (60) foot length, twenty (20) foot width shall be provided at the terminus of all permanent dead end access streets serving residential property. The turnaround, including sidewalk where required, shall be within the right-of-way. The maximum length of permanent cul-de-sac streets shall be twelve hundred (1200) feet. Temporary cul-de-sac streets may be a maximum of six hundred (600) feet in length.		
***Corner Sight Distance: Measured from a driver's eye (3.5 feet above pavement) to a point 3.5 feet above the pavement at a required distance based on miles per hour.** **Stopping Sight Distance: Measured from a driver's eye (3.5 feet above pavement) to a point 3.5 feet above the pavement to a point 6 inches above the pavement at a required distance based on miles per hour**		

(ii) The potential for future development will alter neither the street classification nor the design standards proposed. As a condition for varying the right-of-way requirements, the city may require binding agreements to insure no additional access to or use of the street.

(iii) In no instance shall a right-of-way be less than forty (40) feet. In granting the reduced right-of-way width, it shall be determined that sufficient width will be available to provide for all the following (unless separate right-of-way for them is being provided elsewhere to the satisfaction of the city, or they are clearly not required by the proposed development):

Pavement
Curbs
Shoulders
Utility easements
Drainage swales
Pedestrian and/or bicycle paths
Street trees or other planting strips
Turning lanes
Cut or fill slopes (the right-of-way shall extend five (5) feet beyond the crest or toe of these slopes).

b. Increase in Right-of-Way Width

The city may increase the required right-of-way width for residential streets under the following conditions:

(i) If proposed lots are large enough for further subdivision that may change the street classification in the future to a higher order street, the city may require that the right-of-way width for the higher order street be provided.

(ii) In unusual circumstances, the provision of the elements listed in Subpart a, (iii), of this section, may require right-of-way width in excess of that established in Table 1.

4-104.402 Intersections

a. Pavement shall intersect as nearly as possible to a ninety (90) degree angle for a minimum of fifty (50) feet from an intersection. A proposed intersection of two (2) new public ways at an angle of less than seventy-five (75) degrees shall not be permitted. Not more than two (2) public ways shall intersect at any one point, unless specifically approved by the planning commission.

b. Centerline off-sets of less than one hundred fifty (150) feet between T-type intersections within public ways shall not be permitted, except where the intersected public ways have separated dual drives without median breaks at either intersection.

Where public ways intersect arterial or collector routes, the alignment of such streets shall be continuous. Intersections of arterial or community collector streets shall be at least eight hundred (800) feet apart.

c. Minimum curb or edge of pavement radius shall be determined according to the specifications for the street of higher classification in the street system hierarchy, as specified below: This minimum should not be confused as the right-of-way return radius but is the curb edge of pavement.

MINIMUM RADIUS OF RETURNS AT STREET INTERSECTIONS

STREET CLASSIFICATION	MINIMUM RETURN RADIUS*
RESIDENTIAL ACCESS LANE	10 feet
RESIDENTIAL ACCESS STREET	10 feet
RESIDENTIAL COLLECTOR	15 feet
COMMUNITY COLLECTOR	30 feet
HIGHER ORDER STREETS	As determined by the Enforcing Officer

* This is minimum. The actual spacing shall be determined by the Enforcing Officer based upon the traffic characteristics of the higher order street

d. Whenever a proposed street intersects an existing or proposed street of higher order in the street hierarchy, the street of lower order shall be made a stop street. The street of lower order shall also be designed to provide a minimum corner sight distance as specified in Illustration 1, Street of Lower Order Minimum Corner Sight Distance; and Illustration 2, Paved Taper for Right Turns.

e. Intersections shall be designed with a flat grade wherever practical. In hilly or rolling areas, at the approach to an intersection, a leveling area shall be provided having not greater than a two (2) percent grade for a distance of sixty (60) feet, measured from the nearest right-of-way line of the intersecting public way.

f. The cross-slope on all public ways, including intersections, shall be three (3) percent or less.

4-104.403 Acceleration and Deceleration Lanes

a. Deceleration or turning lanes may be required by the Enforcing Officer along existing and proposed streets as determined by a traffic impact study.

ILLUSTRATION 1

STREET OF LOWER ORDER
MINIMUM CORNER SIGHT DISTANCE

MINIMUM CORNER SIGHT DISTANCE "Y"

Major Road Type / Design Speed	Y (in feet)
Higher Order Street / 50 mph	500
Higher Order Street / 40 mph	400
Community Collector / 40 mph	400
Residential Collector / 35 mph	350
Residential Access Street / 30 mph	300
Residential Access Lane / 25 mph	250

NOTE: The entire area of the clear sight triangle described by points "abc", above, shall be designed to provide an unobstructed view across it from point b, to all points four and one-half (4.5) feet above the roadway along the centerline from point a, to point d.

ILLUSTRATION 2

PAVED TAPER FOR RIGHT TURNS

b. Deceleration Lanes Shall Be Designed to the Following Standards:

(i) On a State Route, the lane shall be designed in conformance with the requirements of the Tennessee Department of Transportation or as approved by the Enforcing Officer, whichever is greater.

(ii) The lane width shall be the same as the required width of the roadway moving lanes for its full stacking length.

(iii) A taper shall begin at the end of the deceleration lane and shall be 8:1 up to thirty (30) mph and 15:1 above thirty (30) mph.

(iv) The minimum lane length shall be as follows:

Design Speed of Road	Minimum Deceleration Lane Length
30 mph	**235 feet**
40 mph	**315 feet**
50 mph	**435 feet**

c. Acceleration lanes are only required when indicated as needed by a traffic impact study. The design shall be as per the recommendation of the Enforcing Officer. As necessary, a paved taper shall be provided for right turns.

4-104.404 Marginal Access and One-Way Streets

a. Classification and Design of Marginal Access Streets

Marginal access streets may be utilized as an alternative to stripping off lots along existing or proposed collector or higher order streets. Marginal access streets shall be classified and designed to conform to the design standards and service restrictions of either residential access lanes or residential access streets as anticipated daily traffic may dictate.

(i) Intersection Spacing

The minimum distance between intersections of the marginal access street with residential collectors shall be three hundred (300) feet. Minimum distances with higher order streets shall be determined by the Enforcing Officer based upon the traffic characteristics of the higher order street.

(ii) Distance Between Travelways

A minimum distance of thirty (30) feet shall be provided between the paved portion of the marginal access street and the paved portion of the higher order street. This area shall be used to provide a visual screen between the roadways by landscaping and/or use of a berm.

b. Utilization and Design of One-Way Streets

One-way streets may be permitted as loop streets or marginal access streets where there is need to separate the directional lanes to preserve natural features to avoid excessive grading for street construction on steep slopes. Pavement and curb transitions shall be designed and constructed in accordance with standards provided by the Enforcing Officer.

4-104.405 Arrangement of Dead-End Streets

a. Temporary Stub Streets

(i) Residential Access Lane and Residential Access Street Stub Streets

Stub streets that are a portion of either a residential access lane or a residential access street may be permitted only within subsections of phased development for which the proposed street extension in its entirety has been approved as part of a preliminary plat.

(ii) Collector Stub Streets

Stub streets shall be required by the city on collector streets provided that the future extension of the street is deemed desirable by the city and conforms to the adopted major thoroughfare plan.

(iii) Temporary Turnarounds

All stub streets shall be provided with a turnaround paved to an outside radius of fifty (50) feet. No turnaround is required if the stub street provides access to four (4) or less lots or housing units. In the later case, a sign indicating a dead-end street shall be posted unless otherwise required by emergency services or the Enforcing Officer.

b. Permanent Dead-End Public Ways

(i) General Design Standards

Where a public way does not extend beyond the boundary of the subdivision and its continuation is not required by the planning commission for access to adjoining property, its terminus shall normally not be nearer to such boundary than one hundred fifty (150) feet. However, the planning commission may require the reservation of an appropriate easement to accommodate drainage facilities, pedestrian traffic, or utilities. A cul-de-sac turnabout shall be provided at the end of a dead-end public way in accordance with the design standards of these regulations.

For greater convenience to traffic and more effective police and fire protection, permanent dead-end public ways shall, in general, be limited in length in accordance with the design standards of these regulations.

(ii) Design of Turnarounds

The type of turnaround required shall be determined by the planning commission based upon recommendation of the Enforcing Officer. In general the design standards presented in Table 2, shall apply. The planning commission will consider alternative terminations when the street is located upon steep slopes and excessive cut or fill will be required to meet the design standards of the typical sections.

4-104.406 Railroads and Limited Access Highways

Railroad right-of-way and limited access highways, where so located as to affect the subdivision of adjoining lands, shall be treated as follows:

a. In residential areas, a buffer strip at least twenty-five (25) feet in depth in addition to the normally required depth of the lot may be required adjacent to the railroad right-of-way or limited access highway. This strip shall be part of the platted lots and shall be designated on the plat: "This strip is reserved for screening; the placement of structures hereon is prohibited."

b. In commercial or industrial areas, the nearest public way extending parallel or approximately parallel to the railroad shall, wherever practicable, be at a sufficient distance therefrom to ensure suitable depth for commercial or industrial usage.

c. Public ways parallel to a railroad, when intersecting a public way which crosses the railroad at grade, shall to the extent practicable, be at a distance of at least one hundred fifty (150) feet from the railroad right-of-way. Such distance shall be determined with due consideration of the minimum distance required for future separation of grades by means of appropriate approach gradients.

4-104.407 Bridges

Bridges of primary benefit to the subdivider, as determined by the planning commission, shall be constructed at the full expense of the subdivider without reimbursement from the governing body. The sharing of expenses for the construction of bridges not of primary benefit to the subdivider, as determined by the planning commission, shall be fixed by special agreement between the governing body and the subdivider.

4-105 Road Construction Specifications

The road construction specifications included in these regulations, as Appendix B, are adopted as a part hereof. These specifications shall be the minimum standards for any subdivision within the jurisdictional area.

4-106 Drainage and Storm Sewers

4-106.1 General Requirements

All plats shall make adequate provisions for storm water or floodwater run-off basins or channels. The storm water drainage system shall be separate and independent from any sanitary sewer system. Each lot shall provide on each lot line the easement necessary for drainage. Easements at least twenty (20) feet in width (ten (10) feet on each abutting lot) shall be required for pipes with diameters of sixty (60) inches or less. Easements at least twenty-four (24) feet in width (or as required by the Enforcing Officer) shall be required for pipes over sixty (60) inches in diameter. The following notation regarding the use of these easements shall be made upon all plats:

"Public utility easements where shown hereon are intended to indicate an easement for construction, operation and maintenance of public utilities including, but not limited to, sanitary sewers, water lines, telephone signal conduits, electric conductors, and natural gas lines. Drainage easements are intended to indicate an easement for construction and maintenance of drainage facilities. The maintenance of drainage facilities is the responsibility of the owner of the property whereon such facilities are located."

4-106.2 Nature of Storm Water Facilities

4-106.201 Storm Water Design and Construction Specifications

The storm water design and construction specifications included in these regulations shall be the minimum standards for any subdivision within the jurisdictional area.

4-106.202 Location

The subdivider shall be required to transport by pipe or open ditch any spring or surface water that may exist prior to or as a result of the subdivision. Such drainage facilities shall be located in the public right-of-way, wherever feasible, or in perpetual unobstructed easements of appropriate width. These facilities shall be constructed in accordance with the construction specifications contained in these regulations.

4-106.203 Accessibility to Public Storm Sewers

Where a public storm sewer is accessible, the developer shall install storm sewer facilities, or if no facilities are within one thousand (1,000) feet, adequate provision shall be made for the disposal of storm water, subject to the specifications contained herein.

4-106.204 Accommodation of Upstream Drainage Areas

A culvert or other drainage facility shall in each case be large enough to accommodate potential runoff from its entire upstream drainage area, whether inside or outside the subdivision. Necessary facilities shall be sized based on the construction specifications assuming conditions of maximum potential development within the watershed.

4-106.205 Effect on Downstream Drainage Areas

The subdivider shall prepare and submit to the Enforcing Officer a study of the effect of each subdivision on existing downstream properties and drainage facilities outside the area of the subdivision. Requirements for the storm water report are included in Section 5-103.3, of these regulations.

Pre-development and post-development runoff rates, volumes and velocities along with associated calculations and maps shall be submitted with a storm water drainage report prepared by a Tennessee registered engineer. If increased runoff rate or total volume impacts downstream drainage structures then these structures shall be improved with the permission of the appropriate property owners. If drainage easements do not exist, the planning commission may require that they be obtained by the developer.

Where it is anticipated that drainage and/or runoff from a development will overload an existing downstream drainage facility, the planning commission shall withhold approval of the subdivision until provision has been made for adequate improvement of such drainage facilities. The subdivider shall be required to construct adequate downstream facilities or contribute his pro-rata share toward the construction of adequate downstream facilities and install on-site storm water detention to mitigate the downstream impacts.

On site storm water detention proposed to reduce the peak rate of discharge to off site drainage systems downstream shall not cause increased peak flows or velocities detrimental to downstream properties or facilities. When detention facilities are utilized, the peak rate of discharge after development shall not exceed the predevelopment peak rate.

Because detention in downstream areas of a large watershed can cause increased peak flows in downstream channels, the city reserves the right to alter the detention criteria and to prohibit it where it is not in the best interest of the city. This decision shall be based on sound engineering judgement and/or studies. The city may also allow in-stream mitigation measures in lieu of detention where it can be shown that such measures are of equal or greater benefit. In all cases where detention facilities are required, the location and design must comply with any master drainage plans that may have been developed.

Controlled releases of discharge from a detention basin shall include "V-notch", rectangular or other weir configurations which prevent increased discharge (above pre-development conditions) for required storm events as listed in Subsection 5-103.3.

Detention facilities shall be platted as perpetual drainage easements and shall be maintained by the property owner or the owners' association, as applicable. A Storm Water Detention Agreement as defined in Subsection 4-106.1, General Requirements, shall be executed. The city will in no way be responsible for maintenance of drainage facilities on private property. Estimated increases in discharge velocity shall be mitigated by energy dissipation devices where required to prevent erosion.

The drainage system shall be designed to honor natural drainage divides, where practical. Surface waters shall not be concentrated and discharged onto adjoining property at rates and/or velocities exceeding predevelopment conditions, unless an easement expressly authorizing such discharge has been granted by the owner of the affected land and the discharge is into an adequate natural watercourse or drainage system.

4-106.206 Areas of Poor Drainage

In general, areas of poor drainage shall be classified as "land unsuitable for development" (see Subsection 4-101.401) and shall not be included in lots. In any instance where it may be necessary to locate a roadway in an area subject to flooding that is not located within the one-hundred year regulatory flood boundary, the planning commission may approve such subdivision; provided, the applicant fills the affected flood area of said subdivision to place public way elevations no lower than the known flood elevation. The plat of such subdivision shall provide for a floodway along the bank of any stream or watercourse of width sufficient to contain or move the water of the one-hundred year regulatory flood, and no fill shall be placed in the floodplain; neither shall any building nor flood-restrictive structure be erected or placed therein. The boundaries of the flood area and floodplain, and the one-hundred year regulatory flood elevation, shall be determined by the planning commission based upon the review specified in Subsection 2-103.2, of these regulations, and the submission of flood data in construction plans as specified in Section 5-103, of these regulations.

As general policy sinkholes shall be classified as "land unsuitable for development" (see Subsection 4-101.401) and shall not be included in streets and lots. In any instance where it is unavoidable, the Enforcing Officer and planning commission shall approve any alteration of a sinkhole or the drainage pattern. (See Subsection 4-102.602, Lot Drainage.)

4-106.207 Floodplain Areas

In all instances the regulatory floodway shall be preserved from any and all destruction or damage resulting from clearing, grading, or dumping of earth, waste material, or stumps. Any subdivision that contains flood prone land shall be subject to the special provisions set forth in Subsections 2-101.4 and 4-101.403, Protection Against Flood Damage, of these regulations.

4-106.208 Storm Water Detention and Discharge Control

The general policy of the city is to provide detention for the increased volume of water generated by a development. The major factors in evaluating drainage designs will be the effect of increased runoff rates on downstream water levels and the proximity of any structures.

Any drainage system that discharges without some form of detention shall route its water along a designated public drainage easement. A drainage system can be allowed to discharge along an existing but non-recorded (prescriptive) easement if the following are true:

a. Post-development flow is less than or equal to the predevelopment flow at the same location. (See Subsection 4-106.205, Effect on Downstream Drainage Areas.)

b. In order to prevent erosion at all outlet points, the subdivider's engineer will be required to design and submit for approval an outlet system that approximates the width and velocity of the flow that existed prior to development.

4-106.3 Dedication of Drainage Easements

4-106.301 General Requirements

Where a subdivision is traversed by a watercourse, drainageway, channel, or stream, there shall be provided a storm water easement or drainage right-of-way conforming substantially to the lines of the one-hundred (100) year flood elevation of such watercourse. Where new open drainageways are utilized they shall be designed for the twenty-five (25) year frequency flood.

4-106.302 Drainage Easements

a. Where topography or other conditions are such as to make impracticable inclusion of drainage facilities within the right-of-way of a public way, perpetual unobstructed easements at least twenty (20) feet in width for such facilities shall be provided across property outside the public way lines and with satisfactory access to public ways. Easements shall be indicated on the preliminary and final plats. Drainage easements shall be carried from the public way to a natural watercourse or to other drainage facilities.

b. When downstream drainage improvements are proposed that will require additional easements across private land outside the

subdivision, appropriate drainage easements must be secured by the developer and indicated on a plat amendment for that property.

c. The applicant shall dedicate, when required by the planning commission, either in fee, or by drainage or conservation easement, the land on both sides of an existing watercourse for a distance to be determined by the Enforcing Officer.

4-106.303 Ditching, Concrete Ditch Paving, and Culverts and Storm Drains

The design and construction details of drainage facilities shall be in accordance with the provisions of these regulations. The Enforcing Officer shall approve the design and construction details of all such facilities.

4-107 Water Facilities

4.107.1 General Requirements

The water distribution system (fire mains and hydrants) shall be sized for the ultimate tributary population and shall meet the fire flow requirements of the Hendersonville Fire Department through the provisions of the latest addition of N.F.P.A. 1141, Fire Protection in Planned Building Groups. In cases where a water supply system consisting of mains and fire hydrants does not exist, the provisions of the latest addition of N.F.P.A. 1231, Standard on Water Supplies for Suburban and Rural Fire Fighting, shall apply. For the purpose of this section, the fire department recognizes the required fire flows as established by the Insurance Services Office (I.S.O.). Water supply systems not publicly owned and installed shall meet the minimum requirements of NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances. Water supplies shall be capable of supplying the required fire flow for at least one (1) hour for fire flows of fifteen hundred (1,500) g.p.m. or less at twenty (20) p.s.i. or for two (2) hours for fire flow greater than fifteen hundred (1,500) g.p.m. at twenty (20) p.s.i. The contractor or installer of water supply systems shall demonstrate by actual test that the capacity of the water supply systems will meet fire protection requirements.

NOTE: The above requirement is based on the required fire flow established by the Insurance Services Office (I.S.O.).

4-107.2 Fire Hydrants

4-107.201 Spacing and Locations

For commercial districts or commercial subdivisions**,*** there shall be one (1) or more hydrants at each street intersection depending on the required fire flow, with intermediate hydrants so that they are not over three hundred (300) feet apart.

NOTE: Commercial districts include business, industrial, warehouse, institutional, educational, hotel and multi-family residential occupancies.

Distance between installed fire hydrants shall not exceed three hundred (300) feet, unless fire department operations or technology would otherwise dictate increased spacing. For buildings exceeding twenty thousand (20,000) square feet in ground floor area, a fire hydrant shall be installed within three hundred (300) feet of any portion of the building. Actual location of fire hydrants shall be as required by the Fire Department prior to installation.

For residential districts or residential subdivisions, there shall be a hydrant at each street intersection with intermediate hydrants so that they are not over five hundred (500) feet apart.

Fire hydrants shall be installed in accordance with the Standards of the American Water Works Association. Hydrants shall have not less than a six (6) inch connection with the mains. A valve shall be installed in the hydrant connection.

Fire hydrants shall be supplied by not less than a six (6) inch diameter main installed on a looped system, or not less than an eight (8) inch diameter main if the system is not looped or the fire hydrant is installed on a dead-end main exceeding three hundred (300) feet in length.

Fire hydrants are needed in sufficient numbers to permit delivery of the needed fire flow utilizing typically available quantities of fire hose and pumper capacities. Insurance Service Office (I.S.O.) has developed a reasonable and easily applied method for fire hydrant distribution evaluation for consideration in the case of each protected property. The I.S.O. method takes into account the design of the fire hydrant, distance from the property and size of hydrant branch and riser. The recommended I.S.O. hydrant credit system is illustrated below:

Type Hydrant	**0-300 Feet**	**301-600 Feet**	**601-1,000 Feet**
1 - 4-1/2" &			
1 - 2-1/2" Outlet	**1,000 g.p.m.**	**670 g.p.m.**	**250 g.p.m.**
2 - 2-1/2" Outlet	**750 g.p.m.**	**670g.p.m.**	**250 g.p.m.**
1 - 2-1/2" Outlet	**500 g.p.m.**	**500 g.p.m.**	**250 g.p.m.**
Riser or Branch			
Less than 6"	**250 g.p.m.**	**250 g.p.m.**	**250 g.p.m.**

An example of use of the table follows:

Assume a property with a needed fire flow of 4,000 g.p.m. Two (2) hydrants, each with two (2), 2-1/2 inch outlets are within three hundred (300) feet; two (2) hydrants, each with one (1), 4-1/2 inch and one (1), 2-1/2 inch outlet are five hundred (500) feet away; and one (1) hydrant with one (1), 4-1/2 inch and one (1), 2-1/2 inch outlet is eight hundred-fifty feet distance.

Referring to the matrix; the first two (2) hydrants are credited at 750 g.p.m. each; the second two (2) at 670 g.p.m. each and last one (1) at 250 g.p.m.; total credit 3,000 g.p.m.. In the example at least one (1) additional standard hydrant is needed within three hundred (300) feet of the test location.

As the table indicates, hydrants with barrels or branch connectors less than six (6) inches in diameter can provide only limited usable water for fire suppression, regardless of the number of outlets. For this reason, new hydrants shall not be installed on mains smaller than six (6) inches in diameter.

4-107.202 Hydrant Types

Two (2) types of fire hydrants (single pumper and dual pumper) shall be used. The type and location of each fire hydrant shall be designated by the city and approved by the governing utility district.

All fire hydrants shall be iron bodied, fully bronze mounted, hydrants manufactured to equal or exceed AWWA Specification C502-64. Hydrants shall be suitable for 150 p.s.i. working pressure and shall be subjected to a test pressure of 300 p.s.i. Inlet connection shall be six (6) inches mechanical joint unless noted otherwise on project drawings. The main hydrant valve shall be compression type, closing with the pressure, with five and one-fourth (5 1/4) inch opening.

Hydrants shall be of the "dry head" type with an oil reservoir and provision for automatic lubrication of stem threads and bearing surfaces each time the hydrant is operated. Double O-ring seals shall be provided to keep water out of the hydrant top. The operating nut shall be one and one-half (1 1/2) inch pentagon, opening to left, and shall be equipped with a weather cap.

Hydrants shall be provided with automatic multiport drain ports arranged to momentarily flush under pressure each time the hydrant is operated. A positive stop shall be provided on the operating stem to prevent over travel when operating the valve.

Fire hydrant shall be supplied with a bituminous coating along the buried portion of hydrant and a chrome yellow enamel finish for above grove portions of the hydrant.

a. **Single Pumper Hydrant** - The single pumper fire hydrant shall be Mueller A-423, or equal.

   Single pumper fire hydrants shall be equipped with two (2), two and one-half (2 1/2) inch hose nozzles, one (1), four and one-half (4 1/2) pumper nozzle, breakable safety flange and safety stem coupling. Bronze nozzles shall be securely locked to prevent them from blowing off. Hose threads shall be National Standard. Nozzle caps shall be equipped with non-kink chains.

b. **Dual Pumper Hydrant** - Dual pumper fire hydrants shall be equipped with two (2), four and one-half (4 1/2) inch pumper nozzles, one (1), two and one-half (2 1/2) inch hose nozzle, breakable safety flange and safety stem coupling. Bronze nozzles shall be securely locked to prevent them from blowing off nozzle. Hose threads shall be National Standard. Nozzle caps shall be equipped with non-kink chains.

4-107.203 Valves

Fire service main system shall have sectional controlling valves at appropriate points, in order to permit sectionalizing the system in the event of a break or for the making of repairs or extensions. A sufficient number of valves should be provided so that a break or other failure will not affect more than one-fourth (1/4) mile of arterial mains.

There shall be a valve at each street intersection with intermediate valves so that they are not over five hundred (500) to one thousand (1,000) feet apart in commercial districts and eight hundred (800) to fifteen hundred (1,500) feet apart in residential districts. The type and location of each valve shall be designated by the city and approved by the governing utility district.

The regulations and specifications of the governing utility district shall otherwise apply to all design and construction of the water system where it has not been covered by these regulations.

To eliminate future road cuts on newly paved surfaces, all underground utilities for fire hydrants, together with the fire hydrants themselves, and all other water supply improvements shall be installed before any final paving of a public way shown on the final subdivision plat, unless otherwise approved by the appropriate governmental official.

4-108 Sewage Facilities

4-108.1 General Requirements

The applicant shall install sanitary sewer facilities in a manner prescribed by the regulations of the Tennessee Department of Environment and Conservation and by any other applicable standards and specifications. All plans shall be designed and approved in accordance with the rules, regulations, specifications, and standards, of any applicable governmental agency or appropriate unit thereof.

4-108.2 Mandatory Connection to Public Sewer System

1. When public sanitary sewers are accessible to the subdivision, as determined by the planning commission, the subdivider shall provide such facilities to each lot therein and shall connect the facilities to the public system. The subdivider shall provide sewers that meet standards set forth in the regulations of the Tennessee Department of Environment and Conservation.

2. All sanitary sewer facilities located in a flood hazard area shall be floodproofed to the regulatory flood protection elevation. All sewer facilities located below the regulatory flood protection elevation shall be designed to prevent infiltration of floodwaters into the sewer system and discharges from the system into floodwaters.

3. All public sanitary sewer systems shall be constructed utilizing materials that are A.S.T.M. and/or A.W.W.A. approved.

4-108.3 Individual Disposal System Requirements

If public sewer facilities are not available and individual disposal systems are proposed the individual disposal system, including the size of the septic tank and size of the tile fields or other secondary treatment device shall be approved by the county health department. The entire individual disposal system, including all drainage fields associated therewith, shall be located on the lot with the principal structure such system is to serve.

The planning commission may prohibit installation of sewage disposal facilities requiring soil absorption systems where such systems will not function due to high groundwater, flooding, or unsuitable soil characteristics. The planning commission may require that the subdivider note on the face of the plat and any deed of conveyance that soil absorption fields are prohibited in designated areas.

4-108.4 Design Criteria for Sanitary Sewers

Sanitary sewer systems shall be designed for the ultimate tributary population and shall be gravity flow systems where possible. Due consideration shall be given to any current zoning regulations and approved planning reports, where applicable. Sewer capacities shall be adequate to accommodate the anticipated maximum hourly quantity of sewage and industrial wastes, together with an adequate allowance for infiltration and other extraneous flow. Sewer connections to dwellings shall not be less than six (6) inches in diameter, short laterals and all other lines shall be eight (8) inches or larger in diameter, depending on anticipated flow.

4-109 Utility Easements

4-109.1 Permanent Easements

Perpetual unobstructed easements down all lot lines or additionally across lots, if deemed necessary by the planning commission, shall be provided for utilities (private or public). Such easements shall be at least ten (10) feet wide, except for across-lot easements that shall be at least twenty (20) feet wide. The subdivider shall take such actions as are necessary to ensure the coordination and continuation of utility easements established on adjacent properties with those proposed within his development. All easements shall be indicated on the plat.

4-109.2 Temporary Construction Easements

Temporary construction easements exceeding the width of permanent easements may be required as necessary until completion of any one project.

4-110 Electrical, Telephone and Television Service Lines

4-110.1 Ungerground Utilities

Following adoption of these regulations all electrical, telephone and television service lines located within any subdivision approved under authority of these regulations shall be placed underground.

4-110.2 Aboveground Utilities

Except as provided in subsection 4-110.3, it shall be unlawful to erect or construct permanent above ground utility equipment (see definition) within any subdivision approved under authority of these regulations.

4-110.3 Exceptions

The following exceptions shall apply to the application of this section.

1. Aboveground utility equipment may be installed, maintained and utilized by utility companies for a period not to exceed ninety (90) days in order to provide emergency utility services. This time limit may be extended, if warranted, by the planning commission.

2. Utility equipment utilized for vehicular or pedestrian traffic control purposes.

3. Utility equipment appurtenant to underground facilities, such as service-mounted, pedestal-mounted, or pad-mounted transformers, terminal boxes, meters and meter cabinets.

4. Temporary utility equipment utilized exclusively in conjunction with construction projects. Upon installation of permanent utility equipment the temporary equipment shall be removed.

5. Fire hydrants, fire plugs and other utility equipment utilized exclusively for fire-fighting purposes.

6. Telephone and television transmission towers.

7. Equipment installed by an electric utility which should not be installed underground for engineering or safety reasons.

8. Electrical transmission lines (see definition) and switch gear.

4-111 Public Uses

4-111.1 Plat to Provide for Public Uses

Whenever a tract to be subdivided includes a school, recreation use, a portion of a major public way, or other public use, as indicated on the land development plan and/or major street or road plan, or any portion thereof, such tract shall be suitably incorporated by the developer into his plat when first presented for review by the planning commission.

After proper determination of its necessity by the planning commission and the appropriate governmental representative(s) involved in the acquisition and use of such site, and after a determination has been made to acquire the site by the public agency, the site shall be suitably incorporated by the developer into the plat prior to final approval by the planning commission and recording of the plat.

4-111.2 Referral to the Governmental Agency Concerned

The planning commission shall refer any plat presented in accordance with Subsection 4-111.1, to the governmental agency concerned with acquisition of the land. The planning commission may propose alternate areas for such acquisition and shall allow the appropriate governmental agency thirty (30) days for reply.

Among the areas which the planning commission may propose for public acquisition, when the commission deems it appropriate and consistent with the policies and purposes set forth in these regulations, is any land within a floodway or floodway fringe determined according to the procedure outlined herein.

The acquiring agency's recommendation, if affirmative, shall include a map showing the boundaries and area of the parcel to be acquired and an estimate of the time required to complete the acquisition.

4-111.3 Notice to Property Owner

Upon receipt of an affirmative report, the planning commission shall notify the property owner and shall designate on all plats any areas proposed to be acquired by any governmental agency.

4-111.4 Duration of Land Reservation

The acquisition of land reserved by a governmental agency on the final plat shall be initiated within twenty-four (24) months of notification, in writing, from the owner that he intends to develop the land. Such letter of intent shall be accompanied by a plat of a proposed development and a tentative schedule of construction. Failure on the part of the governmental agency to initiate acquisition of the property within the prescribed twenty four (24) months shall result in the removal of the "reserved" designation from the property involved and freeing of the property for development in accordance with these regulations.

4-112 Preservation of Natural Features and Amenities

4-112.1 General

Existing features that would add value to residential development or to the area as a whole, such as trees, watercourses and falls, historic spots, and similar irreplaceable assets, shall be preserved in the design of the subdivision, as required by the planning commission. No change of grade of the land shall be undertaken nor shall any natural features (including trees) be removed or relocated until the planning commission has approved a conceptual preliminary plan, construction plans and a development agreement.

4-112.2 Preserving and Protecting Special Sites

It is shall be the policy of the planning commission to exercise due diligence in preserving and protecting all sites of paleontological, prehistoric, historic and/or archeological significance located upon any land area proposed for subdivision within the commission's jurisdictional area. In exercising this authority, the commission shall receive and review all available information pertaining to all such sites. In it's review of any subdivision found to contain a site of historic or prehistoric human activity such as, but not limited to, mounds, forts, earthworks, burial grounds, structures, villages, mines, caves and all locations that are or may be sources of paleontological remains the commission shall utilize all means available to it to achieve the maximum feasible protection for such site(s). In protecting these assets the following provisions shall be observed:

1. Such sites shall be protected from disturbance or destruction as required by Sections 39-17-101 through 39-17-104, Tennessee Code.

2. Upon discovery of any such site, the Tennessee Department of Environment and Conservation, Division of Archeology shall be notified as provided in Section 11-6-107 (d), Tennessee Code.

3. In the event that any cemetery or burial site is proposed for termination, the procedures set out in Sections 46-4-101 through 46-1-104, Tennessee Code, shall be observed.

4-113 Nonresidential Subdivisions

4-113.1 General

If a proposed subdivision includes land that is zoned for a commercial or industrial purpose, the layout of the subdivision with respect to such land shall make such provisions as the planning commission may require. A nonresidential subdivision shall be subject to all the requirements of these regulations; as well as such additional standards as set forth by the planning commission.

4-113.2 Standards

In addition to the principles and standards in these regulations which are appropriate to the planning of all subdivisions, the subdivider shall demonstrate to the satisfaction of the planning commission that the public way, parcel, and block pattern proposed is specifically adapted to the uses anticipated and takes into account other uses in the vicinity. The following principles and standards shall be observed:

1. proposed industrial parcels shall be suitable in area and dimensions to the types of nonresidential development anticipated;

2. special requirements may be imposed by the governing body with respect to any public way, curb, gutter, and sidewalk design and construction specifications;

3. every effort shall be made to protect adjacent residential areas from potential nuisances from the proposed nonresidential subdivision, including provision of extra depth in parcels backing on existing or potential residential development and provisions for permanently landscaped buffer strips, when necessary; and

4. public ways carrying nonresidential traffic, especially trucks, normally shall not be extended to the boundaries of adjacent existing or potential residential areas.